from related (n = 265) *vs.* unrelated donors (n = 238), and 2) from ABO matched (n = 292) *vs.* ABO mismatched donors (n = 211); and 3) analyzed the impact of ABO incompatibility on nonmyeloablative HCT outcomes. Related recipients required less platelet and red blood cell (RBC) transfusions compared to unrelated recipients ($P < 0.0001$ for both), with comparable median numbers of transfused units. Major/bidirectionally ABO-mismatched recipients required more RBC transfusions than ABO-matched recipients ($P = 0.006$). Rates of graft rejection/failure, grades II-IV acute and chronic GVHD, 2-year relapse and 3-year survivals were comparable among ABO-matched, minor-mismatched, and major/bidirectionally mismatched recipients ($P = 0.93$, 0.72, 0.57, 0.36 and 0.17, respectively). Times to disappearance of anti-donor IgG and IgM isohemagglutinins among major/bidirectionally ABO-mismatched recipients were affected by magnitude of pre-HCT titers ($P < 0.001$ for both) but not by GVHD ($P = 0.71$ and 0.78, respectively) and donor type ($P = 0.40$ and 0.35, respectively). In addition, we compared overall transfusion needs among patients received myeloablative (n = 1353) *vs.* nonmyeloablative HCT. We confirmed that myeloablative recipients required more platelet and RBC transfusions than nonmyeloablative recipients (both $P < 0.0001$). Myeloablative patients given PBSC required less platelet transfusions ($P < 0.0001$) than those given marrow while RBC transfusions did not differ significantly. Limiting the comparison to PBSC recipients given the two different conditionings did not change our findings. In conclusion, nonmyeloablative recipients required fewer platelet and RBC transfusions. Among them, both unrelated and major/bidirectionally ABO-mismatched recipients required more RBC transfusions. However, ABO incompatibility did not affect any of the nonmyeloablative HCT outcomes. Furthermore, anti-donor isohemagglutinin titers at the time of transplantation predicted the tempo of titer disappearance after transplantation.

282

THE COST OF HERPES ZOSTER AMONG HEMATOPOIETIC STEM CELL TRANSPLANT RECIPIENTS

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Introduction: Hematopoietic stem cell transplant (HSCT) recipients have a high incidence of herpes zoster (HZ) following transplant surgery. The primary objective of this study was to estimate the incremental medical resource utilization (RU) and costs associated with HZ in this population for the 21 days prior through 3 months after diagnosis with HZ.

Methods: The MarketScan® Research Databases from Thomson Reuters (1999-2007) were assessed to determine the incremental medical RU and cost due to HZ. Cases were selected if they had an ICD-9-CM diagnostic code for HZ (053.×x) following evidence of receiving a hematopoietic stem cell transplant and matched 1:1 via propensity scores to HSCT controls without HZ. Differences in selected treatment and clinical characteristics were assessed using t-tests for continuous variables and chi-square tests for categorical variables. A two-part model (logistic regression/negative binomial generalized estimating equations) was selected for multivariate analysis of incremental medical RU and costs.

Results: Of the 204 HSCT case recipients identified, 21.1% (n = 43) were hospitalized with HZ as the principle diagnosis (0 for controls), 10.8% (n = 22) were diagnosed with ophthalmic HZ, (0 for controls) and 15.7% (n = 32) with neurological impairment due to HZ (0 for controls). There were no claims for disseminated HZ or for the administration of IV acyclovir within 7 days of HZ diagnosis. There was no significant difference in opportunistic infections between cases and controls (47 versus 43, $p = 0.533$). HSCT recipients with HZ had significantly more medical RU in all categories (inpatient admissions, average length of stay, emergency room visits, number of outpatient visits, number of other outpatient services, and out patient prescriptions) compared to controls ($p < 0.01$). HSCT recipients with HZ also had significant incremental medical costs due to HZ (See Table 1).

Conclusions: Herpes zoster has a significant impact on the health, medical service use and medical costs for HSCT recipients. Future advances for the treatment or prevention of HZ in HSCT recipients should be given strong consideration to help alleviate this medical burden.

Table 1. Herpes Zoster related Medical Costs for HSCT Recipients

	N	Observed	Adjusted*
HSCT with HZ	204	$14,424	$10,452
HSCT without HZ (controls)	204	$6,215	$5,661
Incremental Cost		$8,209	$4,791
Lower 95% C.I.			$4,558
Upper 95% C.I.			$5,042

*$p < 0.0001$ for the adjusted incremental cost.

283

HEMATOPOIETIC STEM CELL TRANSPLANTATION FOR PATIENTS WITH SEVERE COMBINED IMMUNODEFICIENCY AND DISSEMINATED BACILLUS CALMETTE-GUéRIN INFECTIONS

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In many countries tuberculosis is an important public health problem and early BCG vaccine is used to prevent severe forms of the disease. In these same countries, the diagnosis of severe combined immunodeficiency (SCID) is usually delayed and children may have disseminated BCG infection at the time they are referred to hematopoietic stem cell transplantation (HSCT). Our objective is to describe the experience transplanting young children with SCID and tuberculosis in two Brazilian institutions.

Methods: retrospective chart review.

Results: A total of 23 children with SCID had allogeneic transplants. Three patients had received BCG vaccine and were treated with at least three drugs to prevent dissemination. Nine patients had disseminated Mycobacterium bovis infection, described in the table. Median age at transplant was 14 months (5-39), 6 were male. Patients had matched sibling donor transplants (N = 2), matched father (1) or haploidentical mother (1), 5/6 unrelated cord blood (4) or marrow (1). The vaccine scar usually produced a very prominent skin lesion that ulcerated and drained after engraftment. Patients also presented with enlarged axillary and retroperitoneal lymphnodes and hepatic/spleen lesions that became more visible on ultrasound, CT or MRI at the time of hematological recovery. All patients were treated with at least 5 drugs (streptomycin, isoniazid, rifampin, ethambutol, ciprofloxacin, azithromycin or clarithromycin) for 1-2 years, until complete resolution of all signs of the disease and complete immunological recovery. Six patients are alive 0.5-11 years post transplant.

Conclusion: BCG-infection is not a contraindication for HSCT in SCID patients. Axillary adenopathy, hepatic and spleen nodules are common at presentation. All clinical findings worsen with engraftment and may slowly resolve after immunological recovery and prolonged therapy with multiple antibiotics.

Patients with disseminated BCG infections

Initials, gender	Age at BMT (months)	Donor	Preparative regimen/ GVHD prophylaxis	Tuberculosis	Other complications	Outcome
GBS, male	10	Unrelated 5/6 Cord Blood	Busulfan, Cyclofosfamide, ATG/ Cyclosporine-Steroids	Vaccine wound, lung infiltrates, finger, eritema nodosum, osteomyelitis	Venoclusive disease, acute GVHD, Mycobacterium kansassi osteomyelitis	11 years post transplant, complete immunological recovery
BSF, male	15	Unrelated 5/6 Marrow	None/ T-cell depletion-Cyclosporine	Vaccine wound, pneumonia, subcutaneous nodules, generalized adenopathy, gut infection	Acute respiratory distress on mechanical ventilation, EBV gut infection with prolonged parenteral nutrition (for 18 months)	11 years post transplant doing well, without infections.
ASR, male	24	Matched Sibling Marrow	None	Vaccine wound	Acute GVHD	5 years post transplant alive and well with complete donor chimerism and immunological recovery
ECS, female	14	Matched Related Marrow (Father)	None	Axillary LN, retroperitoneal LN, vaccine wound, spleen, liver, lung	Acute GVHD, multiple bacteremias, osteomyelitis, fever (40 °C) daily for six months	4 years post transplant with full immunological recovery, still has calcified lesions in the liver and spleen
GFC, male	39	Unrelated 5/6 Cord Blood	Busulfan-Fludarabine/ Cyclosporine-Steroids	Mycobacterium bovis and M.kansassi disseminated infections	Acute and extensive chronic GVHD. Severe autoimmune hemolytic anemia. Skin infection (Microsporidium). Candidemia	Died D + 469 with mixed chimerism due to severe infections and malnutrition
LLC, female	14	Unrelated 5/6 Cord Blood	Busulfan/ Cyclosporine	Axillary LN, vaccine wound	Acute GVHD, RSV pneumonia, CMV pneumonia), Candidiasis, bloodstream infections; nephrotic syndrome	1 year post transplant with mixed chimerism and severe lymphopenia after Campath for autoimmune hemolytic anemia
GAC, male	12	Unrelated 5/6 Cord Blood	Busulfan-Fludarabine/ Cyclosporine-MMF	Axillary and retroperitoneal LN, liver, spleen	Candidiasis, multiple hepatic nodules, CMV-cholecistitis, RSV	5 months post transplant tapering CsA with recurrent infectious problems despite complete donor chimerism
TVVM, male	7	Matched sibling donor	None	Vaccine wound, pneumonia. Ulcer in the arm after enfraftment	Engraftment syndrome followed by graft rejection	Died on D + 98 due to Fusarium sp infection
AO, female	5	Haploidentical Mother	None/CD34 selection and T-cell depletion	Pneumonia and septic shock	-	Died few days after transplant with no engraftment

284

THE MSKCC EXPERIENCE WITH OUTPATIENT INTERMITTENT DOSING OF MICAFUNGIN FOR ANTIFUNGAL PROPHYLAXIS AND TREATMENT FOLLOWING ALLOGENEIC HEMATOPOIETIC STEM CELL TRANSPLANT

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Introduction: Although antifungal prophylaxis is standard treatment following alloHSCT, and data support the use of mold-active agents in the first 100 days or in the setting of GVHD, a number of patients do not tolerate commonly indicated azoles. Micafungin is an echinocandin with activity against Candida and Aspergillus species. PK studies and murine models suggest intermittent dosing of micafungin is efficacious and safe. An alternate day regimen of micafungin for the treatment of esophageal candidiasis (300 mg QOD) was shown to have similar efficacy to standard daily dosing of micafungin (150 mg) or caspofungin (50 mg). Based on these data, we developed a regimen of intermittent dosing of micafungin for antifungal prophylaxis post alloHSCT.

Methods: Patients were followed between May 2007, when we initiated intermittent dosing of micafungin, and June 2009. Fourteen patients (age range 23-63, mean 43) received intermittent dosing of micafungin, either at home (n = 7) or in the infusion center (n = 7). Micafungin was given for prophylaxis in 11 patients (5 with GVHD) and in combination therapy with voriconazole (n = 2) or liposomal amphotericin B (n = 1) in patients with presumed fungal pneumonia. Thirteen patients received micafungin 300 mg 3x/week. One patient initiated prophylaxis at 300 mg 2x/week. The infusion frequency was decreased to 2x/week for 3 patients with GVHD as prednisone was tapered. Patients were followed clinically and with routine imaging for development or progression of fungal infection.

Results: At the conclusion of observation, 11 patients receiving drug for prophylaxis (n = 8) or treatment of presumed invasive fungal infection (n = 3) had completed treatment. The remaining patients continued prophylaxis twice weekly. The median treatment duration was 61 days (range 17 to >528d). A possible breakthrough fungal pneumonia was observed after 17 days of prophylactic micafungin 3x/week in a patient on systemic steroids for GVHD and with a history of presumed fungal pneumonia pre-HSCT. No serious adverse events were noted with the increased dose of micafungin.

Discussion: These preliminary data indicate that intermittent dosing of micafungin post alloHSCT appears to be safe and effective and may provide an outpatient alternative for patients unable to tolerate azoles or those requiring combination therapy. Also, our data provides support for a study to evaluate this new dosing schedule in alloHSCT patients and other high-risk populations.